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With an eye toward applications in quantum mechanics and other areas of science, much work has been done to generalize traditional analytic methods to  $p$ -adic systems. In 2002 the first paper on  $p$ -adic wavelets was published. Since then  $p$ -adic wavelet sets, multiresolution analyses, and wavelet frames have all been introduced. However, so far all constructions have involved dilations by  $p$ . This talk presents the first construction of a  $p$ -adic wavelet system with a more general matrix dilation (quincunx), as well as some recent characterizations of this type of system. Work being done to completely characterize biorthogonal  $p$ -adic systems associated with a multiresolution analysis will also be presented. (Received September 20, 2010)